New Recommendations From the American Diabetes Association:

Implications for Identification and Prevention

David M. Kendall, MD
Chief Scientific and Medical Officer
Diabetes Screening Detection and Prevention

• Diagnosis of Diabetes: 2010
  – ADA Clinical Practice Recommendations
  – A1C for diagnosis

• Screening for Diabetes
  – The Who, what, when and where of diabetes screening and detection
  – Tools from CDC and ADA

• Diabetes Prevention: Practical and Attainable
  – A brief review of clinical trials
  – Recommendations for intervention
  – Cost-benefit analyses
Diagnosis of Diabetes 2009

To test for pre-diabetes or diabetes:

- Fasting plasma glucose
- Oral Glucose Tolerance Test (75 gm),
  - or both are appropriate

An OGTT may be further considered in patients with impaired fasting glucose (IFG)

<table>
<thead>
<tr>
<th>NORMAL</th>
<th>PREDIABETES IFG or IGT</th>
<th>DIABETES</th>
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<tbody>
<tr>
<td>FPG &lt; 100</td>
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<td>2-h PG 140 – 199 (IGT)</td>
<td>2-h PG ≥ 200</td>
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HbA1C is not recommended at this time to diagnose diabetes

ADA Clinical Practice Recommendations, *Diabetes Care* 32 (Suppl 1), 2009
The Emergence of A1C as Diagnostic Tool

A New Look at Screening and Diagnosing Diabetes Mellitus

Christopher D. Saudek, William H. Herman, David B. Sacks, Richard M. Bergenstal, David Edelman, and Mayer B. Davidson


Factors Supporting Use of HbA1C for Screening and Diagnosis

- A1c testing does not require overnight fast
  - Increase rate of screening during non-fasting hours
- HbA1c reflects long-term glycemic burden
  - Relatively less affected by acute (e.g., stress or illness related) perturbations in glucose levels
- Accepted and current guide in management of diabetes
- A1c laboratory methods now well standardized and reliable

Diabetes should be diagnosed when A1C is ≥6.5% (and confirmed).

Confirmation not required if symptomatic and glucose >200 mg/dl.

- If A1C testing not possible, previously diagnostic methods (e.g., FPG or 2 hr PCG with confirmation) are acceptable.
### Diagnosis of Diabetes 2010

- **A1C ≥ 6.5%** (NGSP certified, DCCT* standard)
- Fasting glucose ≥ 126 mg/dl (8 hour fast)
- 2 hour glucose ≥ 200 mg/dl during OGTT (WHO 75 g test)
- If symptoms of hyperglycemia = random glucose ≥ 200 mg/dl

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<td>A1c &lt; 5.7%</td>
<td>A1c 5.7 – 6.4%</td>
<td>A1c ≥ 6.5%</td>
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American Diabetes Association. Standards of Medical Care in Diabetes – 2010
*Diabetes Care* 33; Suppl 1, S11-S61, 2010
Screening, Detection and Prevention of Type 2 Diabetes

The Path Forward
Diabetes Prevention Screening For Pre-diabetes and Diabetes

• Why Screen for Diabetes and Pre-diabetes?
  – Common clinical conditions with established long term health effects
  – Simple screening tests readily available (fasting glucose and A1C)
  – Progression to type 2 diabetes is preventable

• Screening for Type 2 Diabetes
  – ~1 in 4 are undiagnosed, many with complications at diagnosis

Harris MI. *Consultant* 1997;37(suppl):S9
Diabetes Screening and Diagnosis
ADA Criteria – Testing in Asymptomatic Adults

Testing should be considered in all adults who are overweight (BMI ≥ 25) and have additional risk factors:

- Family history of diabetes (1st degree relative)
- High risk ethnic populations group (AA, NA, Asian Am, Latino, Pacific Isl)
- Specific health characteristics
  - CVD, hypertension, dyslipidemia (↓ HDL, ↑TG)
- Prior history of elevated blood glucose or A1C
- History of gestational diabetes or child > 9 lbs at birth
- Other conditions associated with insulin resistance
  - Morbid obesity, polycystic ovarian syndrome (PCOS), acanthosis

*In the absence of risk factors, testing should begin at age 45 years. If normal, testing should be repeated at least every 3 years in a clinic setting*

American Diabetes Association. Standards of Medical Care in Diabetes – 2010
*Diabetes Care* 33; Suppl 1, S11-S61, 2010
Diabetes Screening and Diagnosis
Recommendations for Screening Site

• **Screening in a Healthcare Setting: Why?**
  – Positive screen: Can initiate treatment and obtain follow-up testing
  – Negative screen: Can counsel patient and schedule repeat testing
  – Can refer to primary provider if abnormalities are found

• **Why Not Community Screening (Outside Health Care System)?**
  – Individuals with positive results often do not seek treatment
  – Little chance to counsel following screen
  – Higher false positive rate with fasting glucose (? Random)
  – Testing is poorly targeted – best to focus on groups at highest risk

American Diabetes Association. Standards of Medical Care in Diabetes – 2010
*Diabetes Care* 33; Suppl 1, S14, 2010
Diabetes Risk Assessment
Tools from the ADA and CDC
Diabetes Risk Assessment
Tools from the ADA and CDC

• ADA Public Awareness & Education
  – Risk estimates based on cardio-metabolic risk (Archimedes model)
  – Calculate risk for T2DM, heart attack, stroke: Projected and modified
# Prevention of Type 2 Diabetes

## Lifestyle Intervention

<table>
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<th>Study</th>
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<th>Intervention</th>
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Diabetes Prevention Program (DPP) Prevention of Progression to Diabetes

Percent developing diabetes

![Graph showing cumulative incidence of diabetes development over years from randomization for Placebo (n=1082) and Lifestyle (n=1079, p<0.001 vs. Met and PBO). The graph indicates a 58% reduction in the development of diabetes with lifestyle modifications.](image)

Prevention Of Type 2 Diabetes 2020: Impact of Lifestyle Interventions

- Lifestyle therapy = very effective in preventing or delaying the onset of type 2 diabetes in those at highest risk
  - Family history
  - IFG and IGT
- The lifestyle therapy that works involves three core features
  
  Balanced low-calorie nutrition
  Regular physical activity
  Frequent intervention and support

Broadly integrated into community programs
# Prevention of Type 2 Diabetes Impact of Selected Approaches

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<tr>
<td>DPP</td>
<td>Metformin</td>
<td>3 years</td>
<td>-31%</td>
</tr>
<tr>
<td>TRIPOD - PIPOD</td>
<td>Trog/ Pioglitazone</td>
<td>3 + years</td>
<td>-56%</td>
</tr>
<tr>
<td>STOP-NIDDM</td>
<td>Acarbose</td>
<td>3 years</td>
<td>-21%</td>
</tr>
<tr>
<td>ACT NOW</td>
<td>Pioglitazone</td>
<td>3 years</td>
<td>-81%</td>
</tr>
<tr>
<td>XENDOS</td>
<td>Orlistat</td>
<td>4 years</td>
<td>-45%</td>
</tr>
<tr>
<td>DREAM</td>
<td>Rosiglitazone</td>
<td>3 years</td>
<td>-60%</td>
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Diabetes Prevention Program (DPP)
Prevention of Progression to Diabetes

Percent developing diabetes

- Placebo (n=1082)
- Metformin (n=1073, p<0.001 vs. PBO)
- Lifestyle (n=1079, p<0.001 vs. Met and PBO)

**DREAM:** Investigation of Diabetes Prevention or Delay

**No. at risk**
- **Placebo:** 2634, 2470, 2150, 1148, 177
- **Rosiglitazone:** 2635, 2538, 2414, 1310, 217

**Follow-up (years)**
- 0.0, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6

**Cumulative rate of new-onset diabetes or death**

- **Placebo**
- **Rosiglitazone**

**60% RRR**
- **HR 0.40 (0.35–0.46)**
- **P < 0.0001**

*DREAM Trial Investigators. Lancet 368(9541):1096-105, 2006*
A Practical Approach to Pre-Diabetes and Diabetes Prevention

Screen for Diabetes:
Fasting plasma glucose (and/or OGTT)

IFG or IGT
Pre-diabetes
Lifestyle Intervention

Established Diabetes
Lifestyle plus Metformin

IFG or IGT (Pre-diabetes) plus other features*
Lifestyle Intervention and/or Metformin

Diabetes Screening and Prevention

A Worthwhile Investment?
Cost Effectiveness of the DPP Intervention

- Estimates of lifetime savings of DPP intervention
- Markov modeling of DPP population and treatments
  - Delay of diabetes by 11 (Lifestyle) and 3 years (Metformin)
  - Cost per QALY $1100 (Lifestyle) and $31K (Metformin)

Screening to Detect Type 2 Diabetes: A Cost-effectiveness Analysis

- Evaluate age at initiation and frequency of screening
  - Mathematical model to estimate cost-effectiveness of screening
  - Simulated population of 325,000 people aged 30 without diabetes
Diabetes Prevention: In the News

The New York Times

Health

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An Insurer’s New Approach to Diabetes
By REED ABELSON
Published April 13, 2010

This could be one glimpse of the future of health insurance.

The UnitedHealth Group, one of the nation’s largest health insurers, is teaming up with the YMCA and retail pharmacies to try a new approach to one of the nation’s most serious and expensive medical problems: Type 2 diabetes.
JOINING THE MOVEMENT
Taking meaningful actions that have an impact & inspire others:

**GIVE:** money, time, passion

**ACT:** participate, volunteer, advocate

**LEARN:** explore, discover, connect

**SHARE:** stories, photos, videos

www.stopdiabetes.com